**EXAMINER'S AMENDMENT**

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Wayne Tang on 9/9/09.

The application has been amended as follows:

1. (Currently Amended) A method for processing client file access transactions, the method comprising:

presenting a virtual file system in an adaptive load balancer~~, presenting a virtual file system~~ to a client computer system, the virtual file system providing access to an aggregated set of files stored by a plurality of server file systems respectively associated with a plurality of server computer systems~~, wherein the access to the aggregated set of files is provided through the virtual file system~~;

receiving a client file access transaction from the client computer system, the client file access transaction specifying a file access operation to be performed relative to the virtual file system presented to the client computer system;

processing the client file access transaction in relation to metadata associated with the virtual file system, the metadata including translation data, to ~~perform at least one of~~:

~~if the file access operation requires access to a file stored by the plurality of server file systems, then translating, using the metadata associated with the virtual file system, the client file access transaction into a server file access transaction for access to the file maintained within one of the plurality of server computer systems according to the file access operation specified by the client file access transaction; and~~

~~if the file access operation does not require access to a file stored by the plurality of server file systems, then accessing~~ a) access metadata associated with the virtual file system to complete processing of the file access operation specified by the client file access transaction if the file access operation does not involve accessing a file stored by at least one of the plurality of server file systems; and

b) if the file access operation involves accessing a file stored by at least one of the plurality of server file systems, then translating, using the metadata, the client file access transaction into a server file access transaction for access to the file maintained within at least one of the plurality of server computer systems according to the file access operation specified by the client file access transaction by:

obtaining a virtual file identifier specified in the client file access transaction;

matching the virtual file identifier specified in the client file access transaction to a matching forwarding table entry in a forwarding table to identify a corresponding physical file identifier from the matching forwarding table entry;

creating the server file access transaction by replacing the virtual file identifier specified in the client file access transaction with the corresponding physical file identifier in the matching forwarding table entry, assigning a server transaction identity to the created server file access transaction, determining if an active transaction table includes an active transaction table entry that corresponds to the client transaction identity, and if not, creating an active transaction table entry including the assigned client transaction identity and an identity of the client computer system from which the client file access transaction was received;

storing the server transaction identity in an active transaction table entry that includes the client transaction identity of the received client file access transaction; and

forwarding the server file access transaction to a selected one of the plurality of server computer systems by identifying, from the matching forwarding table entry, the at least one server computer system at which an instance of that file can be accessed using the corresponding physical file identifier and forwarding the server file access transaction to a server computer system corresponding to the identified at least one server computer system.

3. (Currently Amended) The method of claim 2 comprising:

maintaining the metadata associated with the virtual file system in the ~~at least one~~ forwarding table, the forwarding table containing forwarding table entries that provide a mapping of virtual file system parameters to physical file system parameters including a directory location, the mapping including:

a mapping of virtual file identifiers corresponding to each available file accessible by client computer systems in the virtual file system to:

i) at least one corresponding physical file identifier; and

ii) at least one server computer system of the plurality of server computer systems at which an instance of that file can be accessed using that corresponding physical file identifier.

4. (Canceled)

5. (Canceled)

6. (Currently Amended) The method of claim 1 ~~5~~ wherein translating, using the metadata associated with the virtual file system, the server transaction response into a client file access response comprises:

obtaining a physical file identifier specified in the server transaction response;

matching the physical file identifier specified in the server transaction response to a matching forwarding table entry in the at least one forwarding table to identify a corresponding virtual file identifier contained in the matching forwarding table entry;

replacing the physical file identifier specified in the server transaction response with the corresponding virtual file identifier contained in matching forwarding table entry to create the client file access response; and

wherein forwarding the client file access response to the client computer system comprises:

obtaining a server transaction identity specified in the server transaction response;

matching the server transaction identity to an active transaction table entry containing that server transaction identity in the an active transaction table to obtain a client transaction identity that corresponds to that server transaction identity; and

forwarding the client file access response to a client computer system corresponding to a client computer system associated with the client transaction identity identified in matching active transaction table entry in the active transaction table.

7. (Currently Amended) The method of claim 3 wherein the ~~at least one~~ forwarding table includes:

a directory location mapping table containing a mapping of virtual file identities of parent and child directories within the virtual file system, the parent and child directories representing an aggregation of directory structures present within respective server file systems of the plurality of file servers; and

a set of directory file mapping tables, one for each directory in the virtual file system, each directory file mapping table containing a mapping of virtual file identities of files within the virtual file system of that directory to physical file identities of a corresponding file and server computer system and within an aggregation of the respective server file systems of each of the plurality of file servers.

18. (Currently Amended) The method of claim 1 ~~5~~ wherein receiving a client file access transaction comprises:

identifying that the client file access transaction received from the client computer system is a duplicate client file access transaction within the active transaction table;

in response to identifying that the client file access transaction is a duplicate, ignoring the duplicate file access transaction and bypassing processing the client file access transaction in relation to metadata associated with the virtual file system.

29. (Currently Amended) A method for processing client data access transactions, the method comprising:

in an adaptive load balancer, presenting a virtual data system to a client computer system, the virtual data system providing access to an aggregated set of data available from a plurality of server data systems respectively operating within a plurality of server computer systems~~, wherein the access to the aggregated set of data is provided through the virtual data system~~;

receiving a client data access transaction from the client computer system, the client data access transaction specifying a data access operation to be performed relative to the virtual data system presented to the client computer system;

processing the client data access transaction in relation to metadata associated with the virtual data system, the metadata including translation data, to ~~perform at least one of~~:

~~if the data access operation requires access to data available from the plurality of server data systems, then translating, using the metadata associated with the virtual data system, the client data access transaction into a server data access transaction for access to the data available from one of the plurality of server computer systems according to the data access operation specified by the client data access transaction; and~~

~~if the data access operation does not require access to data stored by the plurality of server data systems, then accessing~~ a) access metadata associated with the virtual data system to complete processing of the data access operation specified by the client data access transaction if the data access operation does not involve access to data stored by at least one of the plurality of server data systems; and

b) if the data access operation involves access to data stored by at least one of the plurality of server data systems, then translating, using the metadata, the client data access transaction into a server data access transaction for access to the data maintained within at least one of the plurality of server computer systems according to the data access operation specified by the client data access transaction by:

obtaining a virtual data identifier specified in the client data access transaction;

matching the virtual data identifier specified in the client data access transaction to a matching forwarding table entry in a forwarding table to identify a corresponding physical data identifier from the matching forwarding table entry;

creating the server data access transaction by replacing the virtual data identifier specified in the client data access transaction with the corresponding physical data identifier in the matching forwarding table entry, assigning a server transaction identity to the created server data access transaction, determining if an active transaction table includes an active transaction table entry that corresponds to the client transaction identity, and if not, creating an active transaction table entry including the assigned client transaction identity and an identity of the client computer system from which the client data access transaction was received;

storing the server transaction identity in an active transaction table entry that includes the client transaction identity of the received client data access transaction; and

forwarding the server data access transaction to a selected one of the plurality of server computer systems by identifying, from the matching forwarding table entry, the at least one server computer system at which an instance of that data can be accessed using the corresponding physical data identifier and forwarding the server data access transaction to a server computer system corresponding to the identified at least one server computer system.

33. (Currently Amended) An adaptive load balancer comprising:

a processor;

a memory;

a first communications interface capable of communicating with a client computer system;

a second communications interface capable of communicating with a plurality of server computer systems; and

an interconnection mechanism coupling the processor, the memory, the first communications interface and the second communications interface;

wherein the memory is encoded with an adaptive transaction application that when performed on the processor, produces an adaptive transaction processor that causes the adaptive load balancer to perform the operations of:

presenting a virtual file system to the client computer system via the first communications interface, the virtual file system providing access to an aggregated set of files stored by a plurality of server file systems respectively associated with the plurality of server computer systems~~, wherein the access to the aggregated set of files is provided through the virtual file system~~;

receiving a client file access transaction from the client computer system via the first communications interface, the client file access transaction specifying a file access operation to be performed relative to the virtual file system presented to the client computer system;

processing the client file access transaction in relation to metadata encoded in the memory associated with the virtual file system, the metadata including translation data, to ~~perform at least one of~~:

~~if the file access operation requires access to a file stored by the plurality of server file systems, then translating, using the metadata associated with the virtual file system, the client file access transaction into a server file access transaction for access to the file maintained within one of the plurality of server computer systems according to the file access operation specified by the client file access transaction over the second communications interface; and~~

~~if the file access operation does not require access to a file stored by the plurality of server file systems, then accessing~~ a) access the metadata in the memory associated with the virtual file system to complete processing of the file access operation specified by the client file access transaction if the file access operation does not involve accessing a file stored by at least one of the plurality of server file systems; and

b) if the file access operation involves accessing a file stored by at least one of the plurality of server file systems, then translating, using the metadata, the client file access transaction into a server file access transaction for access to the file maintained within at least

one of the plurality of server computer systems according to the file access operation specified by the client file access transaction by:

obtaining a virtual file identifier specified in the client file access transaction;

matching the virtual file identifier specified in the client file access transaction to a matching forwarding table entry in a forwarding table to identify a corresponding physical file identifier from the matching forwarding table entry;

creating the server file access transaction by replacing the virtual file identifier specified in the client file access transaction with the corresponding physical file identifier in the matching forwarding table entry, assigning a server transaction identity to the created server file access transaction, determining if an active transaction table includes an active transaction table entry that corresponds to the client transaction identity, and if not, creating an active transaction table entry including the assigned client transaction identity and an identity of the client computer system from which the client file access transaction was received;

storing the server transaction identity in an active transaction table entry that includes the client transaction identity of the received client file access transaction; and

forwarding the server file access transaction to a selected one of the plurality of server computer systems by identifying, from the matching forwarding table entry, the at least one server computer system at which an instance of that file can be accessed using the corresponding physical file identifier and forwarding the server file access transaction to a server computer system corresponding to the identified at least one server computer system.

35. (Currently Amended) A computer readable medium having computer executable instructions stored thereon which when executed by at least one processor of an adaptive load balancer cause the processor to process client data access transactions via operations comprising:

in an adaptive load balancer, presenting a virtual data system to a client computer system, the virtual data system providing access to an aggregated set of data available from a plurality of server data systems respectively operating within a plurality of server computer

~~systems, wherein the access to the aggregated set of data is provided through the virtual data system~~;

receiving a client data access transaction from the client computer system, the client data access transaction specifying a data access operation to be performed relative to the virtual data system presented to the client computer system;

processing the client data access transaction in relation to metadata associated with the virtual data system, the metadata including translation data, to ~~perform at least one of~~:

~~if the data access operation requires access to data available from the plurality of server data systems, then translating, using the metadata associated with the virtual data system, the client data access transaction into a server data access transaction for access to the data available from one of the plurality of server computer systems according to the data access operation specified by the client data access transaction; and~~

~~if the data access operation does not require access to data stored by the plurality of server data systems, then accessing~~ a) access metadata associated with the virtual data system to complete processing of the data access operation specified by the client data access transaction if the data access operation does not involve access to data stored by at least one of the plurality of server data systems; and

b) if the data access operation involves access to data stored by at least one of the plurality of server data systems, then translating, using the metadata, the client data access transaction into a server data access transaction for access to the data maintained within at least one of the plurality of server computer systems according to the data access operation specified by the client data access transaction by:

obtaining a virtual data identifier specified in the client data access transaction;

matching the virtual data identifier specified in the client data access transaction to a matching forwarding table entry in a forwarding table to identify a corresponding physical data identifier from the matching forwarding table entry;

creating the server data access transaction by replacing the virtual data identifier specified in the client data access transaction with the corresponding physical data identifier in the matching forwarding table entry, assigning a server transaction identity to the created server data access transaction, determining if an active transaction table

includes an active transaction table entry that corresponds to the client transaction identity, and if not, creating an active transaction table entry including the assigned client transaction identity and an identity of the client computer system from which the client data access transaction was received;

storing the server transaction identity in an active transaction table entry that includes the client transaction identity of the received client data access transaction; and

forwarding the server data access transaction to a selected one of the plurality of server computer systems by identifying, from the matching forwarding table entry, the at least one server computer system at which an instance of that data can be accessed using the corresponding physical data identifier and forwarding the server data access transaction to a server computer system corresponding to the identified at least one server computer system.

The following is an examiner's statement of reasons for allowance: The independent claims distinguishes themselves from the prior art by translating, using metadata, the client data access transaction into a server data access transaction for access to the data maintained within at least one of the plurality of server computer systems according to the data access operation specified by the client data access transaction. This process is done by obtaining a virtual data identifier specified in the client data access transaction; matching the virtual data identifier specified in the client data access transaction to a matching forwarding table entry in a forwarding table to identify a corresponding physical data identifier from the matching forwarding table entry; creating the server data access transaction by replacing the virtual data identifier specified in the client data access transaction with the corresponding physical data identifier in the matching forwarding table entry, assigning a server transaction identity to the created server data access transaction, determining if an active transaction table includes an active transaction table entry that corresponds to the client transaction identity, and if not, creating an active transaction table entry including the assigned client transaction identity and an identity of the client computer system from which the client data access transaction was received and storing the server transaction identity in an active transaction table entry that includes the

client transaction identity of the received client data access transaction in combination with all the elements in the independent claims.

Although prior art system exist that allow the multiple adaptive load balancing of multiple servers, these prior art do not support the translation system using metadata that includes translation data described in the present invention.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DJENANE M. BAYARD whose telephone number is (571)272-3878. The examiner can normally be reached on Monday- Friday 5:30 AM- 3:00 PM..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, William Jr Vaughn can be reached on (571) 272-3922. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/D. M. B./
Examiner, Art Unit 2444
/William C. Vaughn, Jr./
Supervisory Patent Examiner, Art Unit 2444